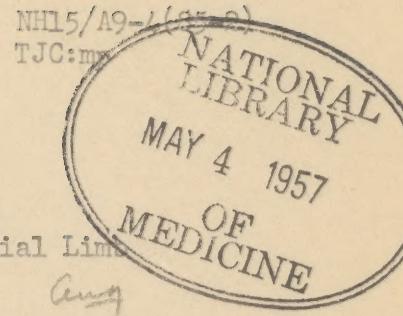


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U. S. NAVAL HOSPITAL

DOCUMENTS SECTION Mare Island, Vallejo, California
1 September 1949



From: Officer in Charge, Artificial Limb Department
To: Medical Officer in Command

Subj: Monthly Report on the Experimental Work of the Artificial Limb Department

Ref: (a) Advisory Committee on Artificial Limbs ltr dtd 21 Jun 1948
(b) Research Division ltr dtd 24 June 1949, BUMED CODE 71/DJD:gh

1. Monthly report required by references (a) and (b) is hereby submitted.
2. The Director of Medical Services, National Defense Establishment, and the Surgeons General of the Army, Navy and Air Forces visited Mare Island and were shown through the laboratory, and a number of amputees wearing various experimental prostheses demonstrated for the visitors.
3. The following projects are under production, experimentation and further study:

(a) Lower Extremities Section:

I. Foot and Ankle (NM 009 035)

Dies for sponge rubber ankle fairings have been delivered, experimental fairings have been made and are ready to undergo life tests. Graphs in the form of moment curves have been partly completed on the new designs of the ankle joint. Additional study and experimentation are required in order to derive basic data controlling the ultimate desirable characteristics. It has been observed that specimens of the same batch of rubber theoretically having a uniform durometer simply are not that uniform and vary on the order of five points in the durometer readings.

Various modifications of the ankle joint continue to be tested on the accelerated testing machine.

II. Shank (NM 009 015)

The first wooden model of the new cosmetic shank in which the anatomical configuration of the anatomy is followed has been completed and the first plastic shin has been produced for use. Work continues on subsequent models prior to manufacture of the molds in the Shipyard.

Through the use of an electric oven equipped with a thermostat numerous plastic materials and combinations are being made and tested.

Preliminary results indicate the shin with the ideal strength-weight ratio should be fabricated of Selectron with a cotton stockinet laminate. The ideal temperature-time ratio for curing the plastic shins appears to be in the order of 130° C. and 77 minutes.

III. Knee

(a) Mechanical (NM 009 036)

Additional minor changes have been made in the design increasing the overall effectiveness of the unit. Additional units are now being used on amputees satisfactorily.

(b) Hydraulic (NM 009 037)

Several slight modifications have been made to eliminate noise. A new aluminum hip hinge has been designed, constructed and is now being worn. This results in the reduction of weight in the unit.

IV. Cosmetic Problem (NM 009 025)

Since the last report one additional female amputee has been fitted with a cosmetic covered shin.

V. Brief summary of status of models as a unit.

(a) Suction Socket (NM 009 029)

Search for suitable flexible plastic for coating inner surfaces of horsehide lining of suction sockets continues. The Dow Chemical formula has proven best to date, but after ten days of intensive wear cracks. Change in formula is being investigated. Another material for trial is enroute from Minnesota Mining and Mfg. Co.

(b) Slip Socket (NM 009 038)

Attempt to secure additional bellows units is being made. The original socket using the bellows continues to operate to the patient's benefit in a satisfactory manner.

(b) Upper Extremities Section:

I. Above elbow arm (NM 009 022)

Work continues on the breadboard model of the elbow lock and installation in the Navy-Fitch arm is incomplete.

II. Hands, Hooks and Tools (NM 009 023)

Lock for the Robinson hand has been installed and preliminary tests promise a considerable improvement over the original toggle type manual device. Additional work on design and installation procedures and problems remain to be accomplished.

Four amputees have been fitted and trained by Miss Little of New York University with the APRL hook. Data to date indicate this hook to be far superior to other existing hooks. Subject patients will be interviewed on dates forty-five and ninety days following date of fitting in cooperation with New York University program.

III. Cosmetic Problem

No work has been done on the cosmetic problem of the arm this month.

IV. Harness and/or other outside control (NM 009 026)

Additional cases continue to be fitted with single nylon shoulder harnesses effectively.

V. Brief summary of status of models as a unit.

(a) Cineplastic prosthesis (NM 009 031)

The bilateral pectoralis motor case underwent surgery. A tenotomy was done on the pectoralis muscle on the right side. This was necessary because the patient could not separate the control of the motor without interference with motion of the stump. The left side, due to its short stump, had been separated traumatically at the time of the original amputation, and the patient has perfect coordination on the left side. Since surgery, the patient now is able to separate his coordination and move the muscle motor without flexing the stump.

The second cineplastic case with a biceps motor in a below elbow stump is undergoing muscle exercises. His motor has good excursion and power.

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